Comprehensive Analysis of Recipient Site Vessels for Distal Vascularized Lymph Node Transfers

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Introduction:
Distal vascularized lymph node (VLN) transfers are becoming recognized as a valuable surgical option to treat extremity lymphedema. Native lymphedematous tissue may impact the quality, location and reliability of recipient vessels in the distal upper and lower extremity. The purpose of this study was to review the characteristics of recipient vessels in order to more accurately predict peri-operative events.

Methods:
An IRB-approved review of a prospective database was performed for patients who underwent distal VLN transfer for upper and lower extremity lymphedema. Pre-operative duplex ultrasonography and intra-operative findings of the recipient sites for all distal VLN transfers were evaluated. Findings related to artery, superficial and deep venous vessel diameter, vessel choice, and vascular-related complications were reviewed.

Results:
Sixty cases of distal VLN transfer were evaluated; 55% lower extremity, 45% upper extremity. In the lower extremity, a majority of transfers (94%) were placed around the ankle region, while two patients received transfers to the proximal leg. Vascular systems used included the posterior tibial (60.6%), the anterior tibial (33.3%), and the medial sural (6.1%) arteries. Average artery diameters were similar around the ankle (3.0mm), and were 2mm for the medial sural artery. The deep and superficial venous systems were used in equal portions, with a smaller proportion using combined systems. Vascular complications occurred in 27.3% of cases, but no site-specific differences were found. In the upper extremity, distal forearm/wrist received a majority of transfers (89%), while three patients received transfers to the elbow region. Recipient vessels included the radial artery-deep branch (59.3%), ulnar artery (29.6%), and ulnar collateral artery (11.1%). Average artery (2.3mm) and vein diameter (2.5mm) were similar in the upper extremity transfers. When specifically evaluating select recipient sites, the volar wrist had a significantly smaller average vein diameter (2.0mm) as compared to other sites ($p=0.04$) and less frequent use of the superficial venous system as outflow ($p=0.02$). Combined, these resulted in a significantly greater occurrence of venous congestion ($p=0.03$).

Conclusions:
Recipient vessels for distal VLN transfers are reliably and predictably present. In the setting of a lymphedematous extremity, deep arterial systems appear to be relatively unaffected, with medium caliber average vessel diameters. Regional differences appear to exist for the usability and selection of recipient veins in various locations.